

Remarks/Arguments

Claims 1-78 and 80-136 were pending in the application. The examiner allowed claims 2-28, 50-84, and 106-118, rejected claims 1, 29, 30, 33, 34, 39, 40, 85-87, 119, 120, and 132-136, and objected to claims 31, 32, 35-38, 41-49, 88-105, and 121-131. Applicant has now amended claims 30, 32, 85, 89, 119, 131, 132, and 134 and added new claims 137-180 to ***include allowable subject matter from previously presented and original dependent claims*** according to the Examiner's Office Action. Claims 1, 29, 31, 79, 86-88, 120-121, 133, and 136 have been cancelled without prejudice to or disclaimer of the subject matter contained therein. Therefore, the applicant believes that all of the pending claims 2-28, 30, 32-78, 80-85, 89-119, 122-132, 134-135, and 137-180 are now either already allowed or in condition for allowance, as explained in more detail below.

Regarding Claim 1:

Applicant has canceled claim 1.

Regarding Claims 2-28:

Claims 2-28 are already allowed in the Examiner's Office Action, as noted above.

Regarding Claim 29:

Applicant has canceled claim 29.

Regarding Claims 30-49:

Independent claim 30 is amended to include the allowable subject matter of dependent claim 31. Consequently, independent claim 30, as now amended, should be allowable, and dependent claim 31 has been canceled to avoid redundancy. Dependent claims 32-49 should also be allowable.

Regarding Claim 50-84:

Claims 50-84 are already allowed in the Examiner's Office Action, as noted above.

Regarding Claims 85-105:

Independent claim 85 is amended to include the allowable subject matter of dependent claim 88, as well as of intervening dependent claims 86 and 87. Consequently, independent claim 85, as now amended, should be allowable, and dependent claims 86-88 have been canceled to avoid redundancy. Dependent claims 89-105 should also be allowable.

Regarding claims 106-118:

Claims 106-118 are already allowed in the Examiner's Office Action, as noted above.

Regarding claims 119-131:

Independent claim 119 is amended to include the allowable subject matter of dependent claim 121, as well as of intervening dependent claim 120. Consequently, independent claim 119, as now amended, should be allowable, and dependent claims 120 and 121 have been canceled to avoid redundancy. Dependent claims 122-131 should also be allowable.

Regarding claims 132-135:

Independent claim 132 is amended to include the GaAs with N and Bi limitations of dependent claim 133, which should be allowable. Please note that, while the examiner rejected dependent claim 133 in the last Office Action, applicant believes such rejection may have been an oversight by the examiner, since isoelectronic co-

doped GaAs:N:Bi is not shown in any of the prior art and has been allowed in other claims, e.g., claims 5 and 6. Therefore, the applicant believes independent claim 132 with GaAs, N, and Bi is prima facie allowable. Dependent claim 133 is canceled to avoid redundancy, and dependent claims 134-135 should also be allowable.

Regarding claim 136:

Applicant has canceled claim 136.

Regarding new claims 137-150 and 158-165:

New independent claims 137, 144, 147, 149, 158, 160 and 163 all recite allowable subject matter from previously presented dependent and original dependent claims and features, which the examiner has indicated to be allowable subject matter. For instance, new claim 137 recites Ga and As as host atoms in an isoelectronically co-doped compound or alloy, which is not taught or suggested by any prior art, and which was allowed, e.g., in independent claim 108 as well as dependent claims 5 and 6. Thus, the applicant believes that new claim 137, along with dependent claims 138-143, are allowable. Likewise, the specific elements recited as host atoms in new independent claims 144 (In and P), 147 (Al, Ga, and P), 149 (In, Ga, and As), 158 (Ga and As), 160 (In and P), 162 (Al, Ga, and P), and 164 (In, Ga, and As) are not taught or suggested by any prior art and are also recited in allowed dependent claims 8, 13, 15, and 5, respectively, as well as allowable dependent claims 35, 37, 41, and 43. Thus, the applicant respectfully submits that new claims 144, 147, 149, 158, 160, 162, and 164, along with dependent claims 145-146, 148, 150, 159, 161, 163, and 165 are clearly allowable and requests that the examiner allow them.

Regarding new claims 151-155 and 166-170:

In new independent claims 151 and 166, applicant has limited the selection of a semiconductor compound or alloy to elements in Groups II and VI of the periodic table, which is not taught or suggest by the prior art and are recited in allowed dependent claims 17-20 and allowable dependent claims 45-49. Applicant believes, therefore, that these claims, as well as the dependent claims 152-155 and 167-170, are clearly allowable and requests that the examiner allow them.

Regarding new claim 171:

New claim 171 claims a method of modifying indirect bandgap GaP and recites a minimum content of 1 at.% for the N and Bi in the GaP:N:Bi crystal lattice, which is not taught or suggested by any of the prior art and is allowed in independent claims 2 and 22 as well as having been indicated to be allowable in dependent claim 31 in the last Office Action. Therefore, applicant believes that new claim 171 is clearly allowable and requests that the examiner allow it.

Regarding new claim 172-175:

New claims 172-175 each claim a light-emitting diode wherein the active layer of the Group III – V semiconductor compound or alloy is limited to a specific compound or alloy, e.g. GaAs (claim 172), InP (claim 173), AlGaP (claim 174), and InGaAs (claim 175), which is not taught or suggested by any of the prior art and is recited in, e.g., claims 5, 8, 13, 15, 35, 37, 41, and 43. Therefore, applicant respectfully submits that new claims 172-176 are allowable and requests that the examiner allow them.

Regarding new claim 176:

New claim 176 claims a light-emitting diode wherein the active layer of the Group III - V semiconductor compound or alloy comprises GaP, but recites the percentage of the co-dopants in the semiconductor alloy to at least 1 at.%, which is not taught or suggested by any of the prior art and is allowed in independent claims 2 and 22 as well as being allowable in dependent claim 31. Therefore, applicant respectfully submits that new claim 177 is allowable and requests that the examiner allow it.

Regarding new claims 177-179:

New claims 177-179 each claim a photodiode wherein the active junction of the Group III – V semiconductor compound or alloy comprises a specific compound or alloy, e.g., AlGaP (claim 177), InGaAs (claim 178), and InP (claim 179), and which is not taught or suggested by any of the prior art and is recited in, e.g., claim 8, 13, 15, 37, 41, and 43. Therefore, applicant respectfully submits that new claims 177-179 are allowable and requests that the examiner allow them.

Regarding new claim 180:

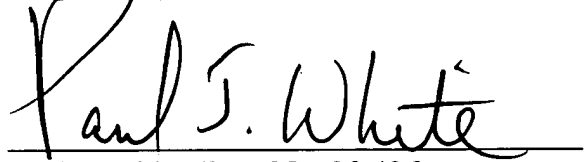
New claim 180 claims a photodiode wherein the active junction of the Group III - V semiconductor compound or alloy comprises GaP, but recites the percentage of the co-dopants in the semiconductor alloy to at least 1 at.%, which is not taught or suggested by any of the prior art and is allowed in independent claims 2 and 22 as well as being allowable in dependent claim 31. Therefore, applicant respectfully submits that new claim 180 is allowable and requests that the examiner allow it.

CONCLUSION

The applicant respectfully submits that all of claims 2-28, 30, 32-78, 80-85, 89-132, 134-135, and 137-180, as amended, are allowable under both 35 U.S.C. § 102(b) and 35 U.S.C. § 103(a) for the reasons explained above and requests that a timely Notice of Allowance be issued in this case. If any issues remain to be resolved, the Examiner is requested to contact applicant's attorney at the telephone number listed below.

Date: August 1, 2003

Respectfully submitted,

A handwritten signature in black ink that reads "Paul J. White". The signature is written in a cursive style with a large, stylized "P" and "W".

Paul J. White, Reg. No. 30,436
Attorney for Applicants
National Renewable Energy Laboratory
1617 Cole Boulevard
Golden, Colorado 80401
Tel.: (303) 384-7576